PB90-234428

Amendment to Best Demonstrated Available Technology (BDAT) Background Document for K037

Versar, Inc., Springfield, VA

Prepared for:

Environmental Protection Agency, Washington, DC

May 90

U.S. Department of Commerce
National Technical Information Service
NTIS

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/530-SW-90- 0600	2.	3. PB90-234428
4. Title and Subtitle FINAL AMENDMENT TO FINAL BDAT BACKGROUND DOCUMENT FOR K037			5. Report Date May 1990 6.
7. Author(s) ~~Rosengrant~~ Kinch/Cunningham			8. Performing Organization Rept. No
9. Performing Organization Name and Address U.S. EPA Office of Solid Waste 401 M. Street SW Washington, DC 20460			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) 68-W9-0068 (G)
12. Sponsoring Organization Name and Address Versar, Inc.			13. Type of Report & Period Covered Background Document - 5/90 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This background document provides the Agency's technical support and rationale for the development of treatment standards for the constituents to be regulated for the above-mentioned wastes.

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA 22161

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
RELEASE UNLIMITED	UNCLASSIFIED	25
	20. Security Class (This Page) UNCLASSIFIED	22. Price 0

(See ANSI-Z39.18)

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)

EPA/530-SW-90-060O
PB90-234428

FINAL

AMENDMENT TO

BEST DEMONSTRATED AVAILABLE TECHNOLOGY (BDAT)

BACKGROUND DOCUMENT FOR

K037

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May 1990

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1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) is promulgating as proposed, best demonstrated available technology (BDAT) treatment standards for wastewater forms of the listed hazardous waste identified in Title 40, Code of Federal Regulations, Section 261.32 (40 CFR 261.32) as K037, wastewater treatment sludges from the production of disulfoton. No comments were received on the proposed treatment standards for K037 wastewaters (see 54 FR 48454, November 22, 1989). These BDAT treatment standards have been revised in accordance with the amendments to the Resource Conservation and Recovery Act (RCRA) of 1976, enacted by the Hazardous and Solid Waste Amendments (HSWA) of November 8, 1984. BDAT treatment standards will be effective no later than May 8, 1990, and on and after the effective date, compliance with these BDAT treatment standards will be a prerequisite under 40 CFR Part 268 for placement of the waste in land disposal units.

This amendment provides the Agency's rationale and technical support for revising BDAT for regulated constituents in K037 wastewaters and for developing treatment standards for these constituents. Numerical standards for the regulated K037 wastewater constituents, disulfoton and toluene, were previously promulgated based on constituent concentration levels in scrubber water residuals from incineration (Reference 1). Biological treatment performance data are now available for closely related wastewater streams containing parathion and toluene (References 2 and 3). EPA believes these data to be a preferable measure of treatment performance because where the Agency has performance data (that conform with BDAT methodology) on wastewater treatment processes and data on incineration (constituent concentrations in scrubber waters), the Agency prefers to establish

treatment standards based on the wastewater treatment process. (See the Second Third final rule, 54 Federal Register (FR) 26594, 26629 (June 23, 1989)). Consequently, biological treatment data have been judged to be Best Demonstrated Available Technology (BDAT) and biological treatment data are being transferred to K037 wastewaters. This amendment would not preclude the use of other technologies to achieve the treatment standards. Treatment standards for nonwastewater forms of K037 are not being revised.

The Agency's legal authority and promulgated methodology for establishing treatment standards and the petition process necessary for requesting a variance from the treatment standards are summarized in EPA's Methodology for Developing BDAT Treatment Standards (Reference 4).

This amendment to the Final Best Demonstrated Available Technology (BDAT) Background Document for K037 presents (1) a discussion of biological treatment as an applicable and demonstrated technology for reducing regulated constituents in organophosphorus wastewater streams, (2) performance data supporting biological treatment as an effective technology for treating organophosphorus wastewater streams, (3) rationale for transferring biological treatment performance data to wastewater forms of K037 and, (4) calculation of new numerical standards. Specifically, Section 2 of this document supplements Section 3 of the Final BDAT Background Document for K037 by introducing biological treatment as an applicable and demonstrated technology for treating wastewater forms of K037. Section 3 of this document amends Section 4 of the Final BDAT Background Document for K037 by adding performance data for biological treatment of parathion and toluene. Section 4 amends Section 5.2 by identifying biological treatment as BDAT for K037 wastewaters. Finally, Section 5 amends Section 7 by presenting revised numerical treatment standards for

disulfoton and toluene in K037 wastewaters.

To determine the applicability of a treatment standard, wastewaters are defined as wastes containing less than 1% (weight basis) total suspended solids[1] (TSS) and less than 1% (weight basis) total organic carbon (TOC). Wastes not meeting this definition are classified as nonwastewaters and must comply with the promulgated nonwastewater treatment standards. The numerical treatment standards for disulfoton and toluene in K037 wastewaters are listed in Table 1-1 at the end of this section. These treatment standards are based on the total concentration of each constituent in a single composite sample of the waste. The units used for regulated constituent concentrations are mg/l (parts per million on a weight-by-volume basis).

[1]The term "total suspended solids" (TSS) clarifies EPA's previously used terminology of "total solids" and "filterable solids." Specifically, total suspended solids are measured by Method 209C (total suspended solids dried at 103-105°C) in Standard Methods for the Examination of Water and Wastewater, Sixteenth Edition (Reference 5).

TABLE 1-1

BDAT TREATMENT STANDARDS FOR K037

Wastewaters

BDAT Nos.	Regulated Constituents	Maximum for Any Single Composite Sample Total Concentration (mg/l)
195	Disulfoton	0.025
43	Toluene	0.080

2.0 AMENDMENT TO SECTION 3 ("APPLICABLE/DEMONSTRATED TREATMENT TECHNOLOGIES") OF THE FINAL BDAT BACKGROUND DOCUMENT FOR K037

This section supplements Section 3 ("Applicable/Demonstrated Treatment Technologies") of the Final BDAT Background Document for K037 by discussing biological treatment as an applicable and demonstrated technology for the treatment of K037 wastewaters, in addition to those technologies already discussed in the K037 Background Document.

2.1 Applicable Treatment Technologies

To be applicable, a technology must theoretically be usable to treat the waste in question or a waste that is similar in terms of parameters that affect treatment selection. (Detailed descriptions of technologies that are applicable to listed hazardous wastes are provided in EPA's Treatment Technology Background Document (Reference 6).

Biological treatment is a technology that uses living microorganisms to decompose organic constituents. The organisms use the organics both as a source of fuel and as building blocks for their own biological structure. Biological treatment can occur either in the presence of oxygen, where it is known as aerobic treatment, or in the absence of oxygen, where it is referred to as anaerobic treatment. The organic constituents are broken down by the microorganisms into water, carbon dioxide, and new microbial mass.

Wastewater forms of K037 are expected to contain parts per million concentrations of disulfoton, toluene and other organic constituents used in the production of disulfoton. Since biological treatment technology provides for decomposition of organic constituents as described above, it is an applicable treatment technology for wastewater forms of K037.

2.2 Demonstrated Treatment Technologies

To be demonstrated, a technology must be employed in full-scale operation for treatment of the waste in question or a similar waste. Technologies available only at pilot plant or bench-scale operations are not considered in identifying demonstrated technologies.

The Agency is not aware of any facilities that treat organic constituents in K037 wastewaters. However, the Agency has identified one facility that uses biological treatment for wastewater containing parathion, an organophosphorus constituent having a similar molecular structure to disulfoton in K037 wastewaters. Biological treatment data for this parathion-containing wastewater were provided during the comment period for the Land Disposal Restrictions for Second Third Scheduled wastes (see 54 FR 26594 (June 23, 1989)). K037 wastewaters and this parathion-containing wastewater are considered similar, not only due to the similar molecular structural similarity of the two predominant toxic constituents within the wastewaters, but also because both are aqueous-based wastes with low organic content. Consequently, the Agency considers biological treatment to be a demonstrated technology for treatment of disulfoton in wastewater forms of K037.

EPA has identified several facilities that use biological treatment for wastewaters containing toluene. These data were identified from EPA's Organic Chemicals, Plastics, and Synthetic Fibers Database (Reference 3). The Agency believes that these wastewaters are similar to K037 wastewaters in terms of their amenability to biological treatment of toluene, in that they both exhibit low organic content in an aqueous matrix.

Because of the similarity to K037 of other wastewaters where biolo-

gical treatment has been demonstrated, the Agency concludes that biological treatment is also demonstrated for K037 wastewaters.

3.0 AMENDMENT TO SECTION 4 ("PERFORMANCE DATA BASE") OF THE FINAL BDAT BACKGROUND DOCUMENT FOR K037

This section presents the data available on the performance of biological treatment for wastewaters similar to K037. The biological treatment data presented in this section are referenced later as a basis to (1) revise BDAT for K037 wastewaters and (2) revise numerical treatment standards for the K037 regulated constituents, disulfoton and toluene.

Treatment performance data, to the extent that they are available to EPA, include concentrations for a given constituent in untreated and treated wastes, the values of operating parameters that were measured at the time the waste was being treated, the values of relevant design parameters for the treatment technology, and data on waste characteristics that affect performance of the treatment technology.

Where data are not available for a specific waste of concern, the Agency may elect to transfer performance data from a demonstrated technology that treats a similar waste or wastes. To transfer data from another waste treatability group, EPA must find that the wastes covered by this (amended) background document are no more difficult to treat than the treated wastes from which performance data are being transferred. EPA's methodology for the transfer of treatment performance data is provided in EPA's Methodology for Developing BDAT Treatment Standards (Reference 4). Transfer of treatment performance data is technically valid in cases where the untested wastes are generated from similar industries or similar processing steps, or have similar waste characteristics affecting treatment selection and performance that are similar to those of the tested wastes.

The Agency does not have any performance data to evaluate biological

treatment of K037 wastewaters. EPA does have data on levels of K037 constituents present in incineration residuals (scrubber water), and these data were used to establish numerical treatment standards. During the "Second Third" comment period, biological treatment data for a wastewater containing the closely related organophosphate, parathion, became available to the Agency. This data was used to derive numerical treatment standards for parathion-containing wastewaters and was also transferred to wastewater streams containing other organophosphates (e.g., K036, K038, K040, P039, P071, P089, P094, P097, and U235) to develop and promulgate treatment standards based on biotreatment. In addition, data on a toluene-containing wastewater also became available to EPA during this time.

EPA believes these biological treatment data to be a preferable measure of treatment performance because where the Agency has performance data (that conform with BDAT methodology) on wastewater treatment processes and data on incineration (constituent concentrations in scrubber waters), the Agency prefers to establish treatment standards based on the wastewater treatment process. (See the Second Third final rule, 54 FR 26594, 26629 (June 23, 1989)). Consequently, the Agency is promulgating (1) a transfer of biological treatment data for treatment of parathion- and toluene-containing wastewaters to K037 wastewaters and (2) revised numerical standards for the K037 regulated constituents, disulfoton and toluene, based on biological treatment instead of incineration.

As a basis for proposing this transfer, EPA believes that wastewaters for which biological treatment data exist are similar to K037 wastewaters for the following reasons. First, both K037 constituents, disulfoton and toluene, are similar or identical to constituents in wastewaters from which EPA proposed to transfer biological treatment data. Disulfoton and parathion are both

organophosphorus compounds with similar molecular structures. Toluene is present in both K037 and in the wastewaters for which biological treatment data are available.

Second, the streams themselves are similar. K037 wastewaters and wastewaters containing parathion and toluene are aqueous-based wastestreams with less than 1% organics. In the case of the parathion biological treatment data, both K037 wastewater and the parathion-containing wastewater derive from the same (organophosphorus insecticide) industry and from similar process chemistry. Moreover, the treatment standards for the wastewater forms of organophosphorus pesticides similar to K037 (including those listed above and, particularly, the disulfoton-containing wastewater, K036), were based on the same biological treatment data for parathion-containing wastewaters, promulgated for the Second Third Scheduled Wastes; Final Rule (54 FR 26594, June 23, 1989).

Because the wastewaters and constituents within them are similar, EPA concludes that the regulated K037 constituents, disulfoton and toluene, are no more difficult to treat biologically than constituents in the wastewaters for which the Agency has biological treatment data. On this basis, EPA is promulgating as proposed, a transfer of biological treatment data for parathion- and toluene-containing wastewaters to K037 wastewaters.

The biological performance treatment data for parathion-containing wastewaters are shown in Table 3-1 (Reference 2). The biological performance treatment data for toluene-containing wastewaters are contained in Volume 1 of the EPA Final Development Document for Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics, and Synthetic Fibers, Point Source Category (Reference 3).

TABLE 3-1 BIOLOGICAL TREATMENT FOR PARATHION*

Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)	Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)	Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)
1	18	0.01	61	30	0.01	121	6	0.01
2	62	0.01	62	15	0.01	122	5	0.01
3	20	0.01	63	15	0.01	123	7	0.01
4	36	0.01	64	30	0.01	124	7	0.01
5	35	0.01	65	25	0.01	125	4	0.01
6	10	0.01	66	12	0.01	126	5	0.01
7	20	0.01	67	17	0.01	127	5	0.01
8	14	0.01	68	23	0.01	128	9	0.01
9	22	0.01	69	15	0.01	129	7	0.01
10	20	0.01	70	18	0.01	130	6	0.01
11	25	0.01	71	21	0.01	131	9	0.01
12	22	0.01	72	26	0.01	132	7	0.01
13	12	0.01	73	17	0.01	133	11	0.01
14	18	0.01	74	12	0.01	134	3	0.01
15	17	0.01	75	20	0.01	135	3	0.01
16	23	0.01	76	9	0.01	136	1	0.01
17	34	0.01	77	18	0.01	137	6	0.01
18	20	0.01	78	15	0.01	138	21	0.01
19	42	0.01	79	11	0.01	139	5	0.01
20	26	0.01	80	17	0.01	140	17	0.01
21	22	0.01	81	18	0.01	141	8	0.01
22	70	0.01	82	9	0.01	142	5	0.01
23	33	0.01	83	20	0.01	143	5	0.01
24	96	0.01	84	18	0.01	144	13	0.01
25	23	0.01	85	17	0.01	145	11	0.01
26	21	0.01	86	21	0.01	146	53	0.01
27	30	0.01	87	8	0.01	147	14	0.01
28	28	0.01	88	21	0.01	148	13	0.01
29	17	0.01	89	15	0.01	149	7	0.01
30	26	0.01	90	18	0.01	150	5	0.01
31	23	0.01	91	9	0.01	151	5	0.01
32	12	0.01	92	11	0.01	152	4	0.01
33	20	0.01	93	11	0.01	153	6	0.01
34	34	0.01	94	16	0.01	154	2	0.01
35	25	0.01	95	14	0.01	155	3	0.01
36	19	0.01	96	16	0.01	156	4	0.01
37	15	0.01	97	22	0.01	157	3	0.01
38	20	0.01	98	10	0.01	158	5	0.01
39	17	0.01	99	22	0.01	159	7	0.01
40	14	0.01	100	15	0.01	160	3	0.01
41	18	0.01	101	14	0.01	161	5	0.01
42	13	0.01	102	12	0.01	162	2	0.01
43	14	0.01	103	21	0.01	163	2	0.01
44	22	0.01	104	14	0.01	164	6	0.01
45	23	0.01	105	14	0.01	165	16	0.01
46	15	0.01	106	9	0.01	166	19	0.01
47	26	0.01	107	16	0.01	167	38	0.01
48	15	0.01	108	9	0.01	168	29	0.01
49	16	0.01	109	14	0.01	169	16	0.01
50	29	0.01	110	20	0.01	170	10	0.01
51	36	0.01	111	24	0.01	171	13	0.01
52	41	0.01	112	5	0.01	172	4	0.01
53	18	0.01	113	4	0.01	173	3	0.01
54	5	0.01	114	7	0.01	174	57	0.01
55	6	0.01	115	8	0.01	175	10	0.01
56	59	0.01	116	10	0.01	176	11	0.01
57	31	0.01	117	13	0.01	177	15	0.01
58	22	0.01	118	6	0.01	178	15	0.01
59	24	0.01	119	13	0.01	179	7	0.01
60	28	0.01	120	9	0.01	180	10	0.01

* These data are reproduced from Reference 2.

TABLE 3-1 BIOLOGICAL TREATMENT FOR PARATHION*

(continued)

Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)	Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)	Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)
181	5	0.01	241	3	0.01	301	11	0.01
182	6	0.01	242	4	0.01	302	18	0.01
183	7	0.01	243	2	0.01	303	12	0.01
184	8	0.01	244	2	0.01	304	8	0.01
185	7	0.01	245	4	0.01	305	23	0.01
186	5	0.01	246	14	0.01	306	11	0.01
187	5	0.01	247	6	0.01	307	18	0.01
188	10	0.01	248	2	0.01	308	26	0.01
189	7	0.01	249	6	0.01	309	10	0.01
190	9	0.01	250	5	0.01	310	11	0.01
191	4	0.01	251	7	0.01	311	8	0.01
192	13	0.01	252	22	0.01	312	5	0.01
193	7	0.01	253	4	0.01	313	11	0.01
194	9	0.01	254	2	0.01	314	12	0.01
195	8	0.01	255	9	0.01	315	20	0.01
196	7	0.01	256	2	0.01	316	6	0.01
197	6	0.01	257	2	0.01	317	9	0.01
198	9	0.01	258	2	0.01	318	9	0.01
199	5	0.01	259	6	0.01	319	11	0.01
200	8	0.01	260	3	0.01	320	9	0.01
201	5	0.01	261	7	0.01	321	8	0.01
202	9	0.01	262	12	0.01	322	3	0.01
203	4	0.01	263	40	0.01	323	7	0.01
204	5	0.01	264	146	0.01	324	6	0.01
205	5	0.01	265	59	0.01	325	14	0.01
206	6	0.01	266	13	0.01	326	13	0.01
207	2	0.01	267	13	0.01	327	11	0.01
208	5	0.01	268	25	0.01	328	12	0.01
209	7	0.01	269	14	0.01	329	11	0.01
210	4	0.01	270	15	0.01	330	7	0.01
211	7	0.01	271	85	0.01	331	7	0.01
212	3	0.01	272	122	0.01	332	11	0.01
213	2	0.01	273	32	0.01	333	8	0.01
214	6	0.01	274	26	0.01	334	8	0.01
215	3	0.01	275	21	0.01	335	6	0.01
216	3	0.01	276	13	0.01	336	6	0.01
217	2	0.01	277	15	0.01	337	12	0.01
218	2	0.01	278	17	0.01	338	8	0.01
219	3	0.01	279	13	0.01	339	11	0.01
220	3	0.01	280	23	0.01	340	6	0.01
221	2	0.01	281	16	0.01	341	15	0.01
222	2	0.01	282	15	0.01	342	9	0.01
223	2	0.01	283	27	0.01	343	5	0.01
224	4	0.01	284	32	0.01	344	8	0.01
225	4	0.01	285	24	0.01	345	16	0.01
226	7	0.01	286	21	0.01	346	17	0.01
227	2	0.01	287	22	0.01	347	11	0.01
228	5	0.01	288	25	0.01	348	13	0.01
229	8	0.01	289	18	0.01	349	7	0.01
230	2	0.01	290	6	0.01	350	15	0.01
231	6	0.01	291	13	0.01	351	9	0.01
232	6	0.01	292	7	0.01	352	9	0.01
233	2	0.01	293	21	0.01	353	9	0.01
234	3	0.01	294	3	0.01	354	11	0.01
235	4	0.01	295	11	0.01	355	14	0.01
236	6	0.01	296	28	0.01	356	5	0.01
237	6	0.01	297	16	0.01	357	4	0.01
238	2	0.01	298	7	0.01	358	8	0.01
239	7	0.01	299	40	0.01	359	8	0.01
240	8	0.01	300	20	0.01	360	20	0.01

* These data are reproduced from Reference 2.

TABLE 3-1 BIOLOGICAL TREATMENT FOR PARATHION*

(continued)

Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)	Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)	Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)
361	5	0.01	421	3	0.01	481	2	0.01
362	6	0.01	422	6	0.01	482	2	0.01
363	14	0.01	423	6	0.01	483	9	0.01
364	9	0.01	424	12	0.01	484	4	0.01
365	13	0.01	425	3	0.01	485	6	0.01
366	7	0.01	426	2	0.01	486	7	0.01
367	10	0.01	427	2	0.01	487	6	0.01
368	9	0.01	428	2	0.01	488	9	0.01
369	9	0.01	429	2	0.01	489	9	0.01
370	9	0.01	430	2	0.01	490	5	0.01
371	7	0.01	431	3	0.01	491	3	0.01
372	6	0.01	432	3	0.01	492	5	0.01
373	5	0.01	433	3	0.01	493	6	0.01
374	9	0.01	434	6	0.01	494	3	0.01
375	7	0.01	435	3	0.01	495	3	0.01
376	11	0.01	436	5	0.01	496	4	0.01
377	17	0.01	437	6	0.01	497	1	0.01
378	13	0.01	438	8	0.01	498	1	0.01
379	22	0.01	439	9	0.01	499	6	0.01
380	7	0.01	440	9	0.01	500	3	0.01
381	14	0.01	441	4	0.01	501	2	0.01
382	7	0.01	442	7	0.01	502	6	0.01
383	6	0.01	443	10	0.01	503	6	0.01
384	6	0.01	444	6	0.01	504	5	0.01
385	5	0.01	445	5	0.01	505	8	0.01
386	6	0.01	446	5	0.01	506	4	0.01
387	6	0.01	447	5	0.01	507	3	0.01
388	13	0.01	448	3	0.01	508	4	0.01
389	10	0.01	449	3	0.01	509	4	0.01
390	5	0.01	450	8	0.01	510	5	0.01
391	17	0.01	451	5	0.01	511	5	0.01
392	11	0.01	452	8	0.01	512	4	0.01
393	20	0.01	453	4	0.01	513	4	0.01
394	20	0.01	454	7	0.01	514	4	0.01
395	9	0.01	455	2	0.01	515	4	0.01
396	9	0.01	456	5	0.01	516	4	0.01
397	9	0.01	457	3	0.01	517	5	0.01
398	11	0.01	458	6	0.01	518	15	0.01
399	9	0.01	459	4	0.01	519	10	0.01
400	7	0.01	460	4	0.01	520	6	0.01
401	5	0.01	461	5	0.01	521	3	0.01
402	9	0.01	462	9	0.01	522	10	0.01
403	5	0.01	463	5	0.01	523	17	0.01
404	8	0.01	464	5	0.01	524	21	0.01
405	9	0.01	465	7	0.01	525	37	0.01
406	4	0.01	466	8	0.01	526	72	0.01
407	9	0.01	467	3	0.01	527	31	0.01
408	6	0.01	468	3	0.01	528	20	0.01
409	8	0.01	469	2	0.01	529	30	0.01
410	5	0.01	470	4	0.01	530	22	0.01
411	7	0.01	471	3	0.01	531	35	0.01
412	10	0.01	472	4	0.01	532	16	0.01
413	3	0.01	473	5	0.01	533	12	0.01
414	6	0.01	474	4	0.01	534	18	0.01
415	7	0.01	475	4	0.01	535	32	0.01
416	5	0.01	476	2	0.01	536	33	0.01
417	14	0.01	474	2	0.01	537	37	0.01
418	6	0.01	475	2	0.01	538	13	0.01
419	6	0.01	479	1	0.01	539	5	0.01
420	4	0.01	480	4	0.01	540	6	0.01

* These data are reproduced from Reference 2.

TABLE 3-1 BIOLOGICAL TREATMENT FOR PARATHION*

(continued)

Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)	Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)	Sample Number	Untreated Waste (ppm)	Treated Waste (ppm)
541	5	0.01	601	4	0.01	661	9.9	0.002
542	13	0.01	602	7	0.01	662	6.6	0.004
543	7	0.01	603	5	0.01	663	10	0.004
544	4	0.01	604	12	0.01	664	12.8	0.003
545	12	0.01	605	9	0.01	665	12.7	0.003
546	8	0.01	606	2.4	0.002	666	15.3	0.004
547	21	0.01	607	2.6	0.001	667	9.9	0.006
548	17	0.01	608	0.8	0.002	668	5.6	0.002
549	13	0.01	609	1.5	0.002	669	15.3	0.006
550	8	0.01	610	1	0.004	670	20.2	0.003
551	13	0.01	611	1.9	0.002	671	11.5	0.005
552	6	0.01	612	1.3	0.001	672	37.4	0.01
553	9	0.01	613	4.1	0.003	673	10	0.007
554	10	0.01	614	13.6	0.003	674	10.5	0.002
555	17	0.01	615	5	0.005	675	15.3	0.005
556	12	0.01	616	6.5	0.014	676	6.4	0.002
557	12	0.01	617	7.7	0.002	677	4.5	0.001
558	11	0.01	618	4.9	0.003	678	15.4	0.002
559	3	0.01	619	5.4	0.004	679	13.6	0.006
560	7	0.01	620	4.1	0.002	680	10.1	0.003
561	7	0.01	621	4.9	0.003	681	9.3	0.002
562	7	0.01	622	10.8	0.002	682	2.1	0.002
563	13	0.01	623	9	0.004	683	1.6	0.003
564	5	0.01	624	7.7	0.004	684	1.4	0.003
565	10	0.01	625	5.6	0.004	685	1.9	0.004
566	15	0.01	626	7.5	0.015	686	2.2	0.004
567	11	0.01	627	8.5	0.013	687	4.8	0.004
568	14	0.01	628	10.4	0.008	688	7.5	0.003
569	7	0.01	629	15.2	0.004	689	3.3	0.001
570	14	0.01	630	16.2	0.003	690	2.3	0.001
571	10	0.01	631	9.7	0.002	691	2.6	0.001
572	12	0.01	632	3.9	0.004	692	1.5	0.001
573	21	0.01	633	4.7	0.003			
574	5	0.01	634	6.1	0.018			
575	5	0.01	635	11	0.002			
576	10	0.01	636	7.7	0.002			
577	9	0.01	637	8.6	0.002			
578	14	0.01	638	10.7	0.006			
579	12	0.01	639	3	0.016			
580	9	0.01	640	6.8	0.009			
581	26	0.01	641	6.3	0.008			
582	37	0.01	642	17.1	0.01			
583	11	0.01	643	9.1	0.006			
584	11	0.01	644	5.3	0.008			
585	8	0.01	645	4.3	0.002			
586	6	0.01	646	8.5	0.006			
587	9	0.01	647	8.8	0.008			
588	20	0.01	648	5.6	0.005			
589	7	0.01	649	5.8	0.004			
590	17	0.01	650	6.9	0.001			
591	9	0.01	651	14.8	0.007			
592	10	0.01	652	9.2	0.005			
593	5	0.01	653	8.4	0.003			
594	7	0.01	654	4.8	0.002			
595	6	0.01	655	6.8	0.004			
596	2	0.01	656	19	0.001			
597	19	0.01	657	5.9	0.002			
598	21	0.01	658	5.7	0.005			
599	11	0.01	659	7	0.003			
600	5	0.01	660	2.7	0.003			

* These data are reproduced from Reference 2.

4.0 AMENDMENT TO SECTION 5.2 ("IDENTIFICATION OF BEST DEMONSTRATED AVAILABLE TECHNOLOGY FOR K037" - WASTEWATERS) OF THE FINAL BDAT BACKGROUND DOCUMENT FOR K037

This section presents the rationale for amending the determination of best demonstrated available technology (BDAT) for wastewater forms of K037 from incineration to biological treatment.

After identifying applicable and demonstrated technologies for treatment of the waste of concern EPA, EPA evaluated whether these technologies are available. A treatment technology is considered "available" if it is (1) commercially available and (2) provides substantial treatment of the waste.

As described in the Final BDAT Background Document for K037, incineration is commercially available and provides substantial treatment of the organic constituents of concern in wastewater forms of K037. EPA has also determined that biological treatment is available for treatment of wastewater forms of K037. Biological treatment services may be purchased at a number of full-scale commercial waste treatment facilities. Biological treatment technology may also be purchased for on site use. Therefore, biological treatment is commercially available. Other data indicate that parathion- and toluene-containing wastewaters judged to be similar to K037 wastewaters were treated by biological treatment to concentrations at or nearly at the detection limits. These data are presented in Table 3-1 of this document and in Reference 3 and indicate substantial treatment. Therefore, biological treatment and incineration are both considered "available" for treatment of treatment of K037 wastewaters.

EPA is amending the selected BDAT treatment technology for K037 wastewaters from incineration to biological treatment because new data has become available on biological treatment. When the Agency has performance data on a

wastewater treatment process and data on incineration (constituent concentrations in scrubber water), the Agency prefers to establish treatment standards based on the wastewater treatment process. (See the Second Third Final Rule, 54 FR 26594, 26629 (June 23, 1989)). Therefore, EPA has determined that biological treatment is BDAT for wastewater forms of K037 and is amending the previous designation of incineration as BDAT for this waste.

5.0 AMENDMENT TO SECTION 7 ("CALCULATION OF BDAT TREATMENT STANDARDS") OF THE FINAL BDAT BACKGROUND DOCUMENT FOR K037

The Agency bases numerical treatment standards for regulated constituents on the performance of well-designed and well-operated treatment systems. These standards must account for analytical limitations in available treatment performance data, and the data must be adjusted for variabilities related to treatment, sampling, and analytical techniques and procedures.

BDAT treatment standards are determined for each constituent by multiplying the arithmetic mean of accuracy-adjusted constituent concentrations detected in treated waste by a "variability factor" specific to each constituent. Variability factors correct for normal variations in the performance of a particular technology over time. They are designed to reflect the 99th percentile level of performance that the technology achieves in commercial operation. For more information on the principles of accuracy adjusting constituent concentrations and calculating variability factors, see Methodology for Developing BDAT Treatment Standards (Reference 4).

The previous promulgated treatment standards for wastewater forms of K037 were based on the concentrations of disulfoton as measured in grab samples of scrubber water from the incineration of K037 nonwastewaters. The amended treatment standards being promulgated as proposed for disulfoton in wastewater forms of K037, are based on the concentrations of parathion as measured in composite samples of wastewater from the biological treatment of parathion-containing wastewaters. The amended treatment standards being promulgated as proposed for toluene in wastewater forms of K037, are based on the concentrations of toluene as measured in composite samples of wastewater from

the biological treatment of toluene-containing wastewaters.

Development of the Disulfoton Treatment Standard. The proposed treatment standard for disulfoton is based on treatment performance data for parathion. EPA believes the transfer of treatment data on parathion to disulfoton is valid based on similar molecular structure. The treatment standard was calculated by multiplying the arithmetic average of the accuracy-corrected constituent concentrations by a variability factor. The arithmetic average of the accuracy-corrected constituent concentrations is 0.0093 ppm as calculated in the Final BDAT Background Document for Organophosphorus Wastes (Reference 2).

The variability factor calculated for parathion is 2.64 (Reference 2). The variability factor accounts for the variability inherent in treatment system performance, treatment residual collection, and analysis of the samples of the treated waste.

Multiplying the arithmetic average of the corrected constituent concentration for parathion (0.0093) by the variability factor (2.64) yields a treatment standard for disulfoton of 0.025 mg/l.

Development of the Toluene Treatment Standard. The proposed treatment standard for toluene was calculated in a similar manner to that for disulfoton. The median of Estimated Long-Term Means of 10 ug/l (Table VII-64, Reference 3) is multiplied by the calculated daily variability factor of 7.9506 (Table VII-66, Reference 3) to derive a proposed treatment standard of 0.080 mg/l for toluene.

The data used to calculate treatment standards for both disulfoton and toluene were obtained from analysis of composite samples of wastewater from biological treatment. Since the data are based on composite samples, the treatment standards have been specified as applicable to composite samples.

6.0 ACKNOWLEDGEMENTS

This document was prepared for the U.S. Environmental Protection Agency, Office of Solid Waste, by Radian Corporation under Contract No. 68-W9-0072. This document was prepared under the direction of Mr. Richard Kinch, Acting Chief, Waste Treatment Branch; Mr. Larry Rosengrant, Chief, Treatment Technology Section; and Mr. Jerry Vorbach, Project Officer. Ms. Mary Cunningham served as the project manager for K036 regulatory development.

The following personnel from Radian Corporation were involved in preparing this document: Mr. John Williams, Program Manager, Ms. Lori Stoll, Project Director, and the Radian engineering team, Ms. Debra Falatko and Mr. Steven Cragg.

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